

Serial Interface to Flash–Memory Chip Using PCI–Express–Like Packets and Packed Data for Partial–Page Writes

Abstract

A serial flash–memory chip has a serial–bus interface to an external controller. A flash–memory block in the serial flash–memory chip can be read by the external controller sending a read–request packet over the serial bus to the serial flash–memory chip, which reads the flash memory and sends the data back in a data–payload field in a completion packet. Data in a write–request packet is written to the flash memory, and a message packet sent back over the serial bus. The serial bus can be a Peripheral Component Interconnect (PCI) Express bus with bi–directional pairs of differential lines. Packets have modified–PCI–Express headers that define the packet type and data–payload length. Vendor–defined packets can send flash commands such as reset, erase, or responses after operations such as program or erase. A serial engine and microcontroller or state machine are on the serial flash–memory chip.